Scanned Exam Three

NAME:

Directions: Please print this assessment and solve **all three problems.** You must show justification for each solution or you will not receive full credit for the problem. Each problem is worth ten points. Scan your solutions and upload them to the named folder under the MyMathLab Dropbox by **11:59 PM CDT, Sunday, July 9th.**

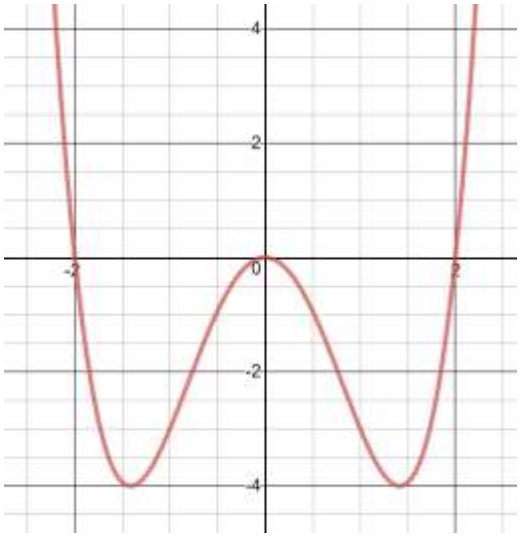
Problem 1. Evaluate the limits. Use $-\infty$ and ∞ where appropriate. If the limit does not exist, state DNE. State where you apply L'Hopital's Rule. Under your solution, write a sentence explaining whether L'Hopital's Rule was required to solve the limit or if there is another method that would also work e.g. factoring or some other algebraic simplification.

(a) $\lim_{x\to 0^+} \frac{x^2-2x}{6e^x+7x-6e^{2x}} =$

(b) $\lim_{x\to 3} \frac{4x^2-7x-15}{x^2-9}$

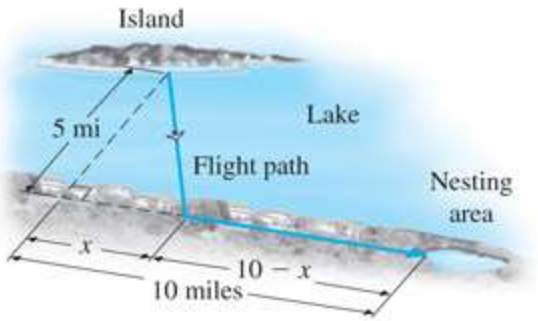
Problem 2. Consider the graph of the function $y = f(x)$ pictured:

(a) Use the graph to find the absolute maximum and minimum values of f(x) on the interval $[-2,1]$. At which x-values do the maximum and minimum occur? Does f(x) have any local maxima or minima on $[-2,1]$? If so, at which x-values?



(b) Given $g(x) = x\sqrt{4x - 8}$, find the absolute maximum and minimum values of $g(x)$ on the interval $[2, 6]$.

Problem 3. Some birds tend to avoid flights over large bodies of water during daylight hours. Suppose that an adult bird with this tendency is taken from its nesting area on the edge of a large lake to an island 5 miles offshore and is then released (see the figure below).



If it takes 1.4 times as much energy to fly over water as land, how far up the shore (x, in miles) should the bird head to minimize the total energy expended in returning to the nesting area?